

**IN THE CLAIMS:**

✓ Please amend the claims as follows:

38 2. (Amended) A transmitter according to claim 1, wherein a local oscillator signal drives the modulator at a multiple of its frequency.

39 6. (Amended) A sub-harmonic mixer, comprising switching means, a first port for inputting a baseband signal to the switching means to be upconverted, and a second port for inputting a local oscillator signal to drive the switching means at an even multiple of the local oscillator frequency for upconverting the baseband signal to transmission frequency.

✓ Please insert new claims 7-12 as follows:

7. (New) A transmitter of a portable radio communication apparatus comprising:

310 a modulator including a switching circuit, a first port for input of a baseband signal and a second port for input of a local oscillator signal to the switching circuit which provides a conductance waveform at a frequency multiple of an oscillation frequency of the local oscillator signal, and a mixer which mixes the baseband signal with the conductance waveform at the frequency multiple of the local oscillator signal frequency for up-converting the baseband signal to a radio frequency modulated carrier, and a gain control, coupled to the modulator, which controls the gain of the modulator to control the output level of the modulator.

8. (New) A transmitter according to claim 7, wherein:  
the local oscillator signal drives the switching circuit at a multiple of a  
frequency of the local oscillator.

9. (New) A transmitter according to claim 7, wherein:  
the gain control comprises a current control.

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10. (New) A transmitter according to claim 7, wherein the switching circuit of  
the modulator comprises:

two cross-coupled pairs of switching elements, wherein the local oscillator  
signal modulates the switching elements at the frequency multiple of the local  
oscillator frequency.

11. (New) A transmitter according to claim 10, wherein:  
the two cross-coupled pairs of switching elements comprise two cross  
connected long tail pairs of bipolar transistors.

12. (New) A sub-harmonic mixer, comprising:

a switching circuit; and

BIO a first port for input of a baseband signal to the switching circuit to be up-converted and a second port for input of a local oscillator signal which drives the switching circuit at an even multiple of the local oscillator frequency for upconverting the baseband signal to a transmission frequency.

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